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saving energy and
taxpayer dollars in
federal facilities

Purchasing Specifications for Energy-Efficient Products

Legal Authorities

Federal agencies are required by the Energy Policy Act of 2005 (P.L. 109-58) and Federal Acquisition Regulations (FAR) Subpart 23.2 to specify and buy ENERGY STAR®-qualified products or, in categories with no ENERGY STAR label, FEMP-designated products which are among the highest 25 percent of equivalent products for energy efficiency.

Performance Requirement for Federal Purchases			
To Replace Incandescent Bulb Rated At:	Typical CFL Replacement Wattage	Necessary Light Output ^a (Lumens)	Required CFL Lumens per Watt (lpw)
Bare Bulbs ^b			
40 watts	11-14 watts	495 or more	45 lpw or more
60 watts	15-19 watts	900 or more	60 lpw or more
75 watts	20-25 watts	1200 or more	60 lpw or more
100 watts	≥ 29 watts	1750 or more	60 lpw or more
Reflector Type Bulbs			
50 watts	17-19 watts	550 or more	33 lpw or more
60 watts	20-21 watts	675 or more	40 lpw or more
75 watts	≥ 22 watts	875 or more	40 lpw or more

a) Some more-efficient lower-wattage CFLs can produce equivalent light output to the corresponding incandescent bulbs (listed in the left-hand column). To assure sufficient lighting, make sure the CFL replacement provides enough lumens.

b) Covered bulbs have lower lumens per watt. Required lpw for covered lamps are as follows: ≤ 14 watts: 40 lpw; 15-19 watts: 48 lpw; 20-24 watts: 50 lpw; ≥ 25 watts: 55 lpw.

Buying Energy-Efficient Compact Fluorescent Lamps (CFLs)

The federal supply sources for CFLs are the Defense Logistics Agency (DLA) and the General Services Administration (GSA). DLA sells CFLs through its *Energy Efficient Lighting* catalog. GSA offers CFLs on Schedule 62-II, as well as through its online shopping network, *Advantage!* Look for products that provide the needed light output (lumens) and meet or exceed the required lumens per watt performance.

CFLs are sold either as “integral” bulb/ballast combinations or “modular” systems, which have one or more pin-based bulbs that may be replaced separately while re-using the ballast. When buying integral CFLs from a commercial source (retailer or distributor), select or specify models with the ENERGY STAR label. All ENERGY STAR-qualified products meet this specification. Only integral CFLs, not modular types, are included in the ENERGY STAR labeling program.



Modular CFLs allow a separate pin-based bulb to be replaced when one burns out. The ballast and base can generally be re-used for about five bulb replacements. (Most ballasts are rated at 50,000 hours.) Select or specify modular bulb/ballast systems that meet the specified performance levels above. For a modular CFL, make sure that the bulb’s lumen output is rated for the specific ballast used and that the pin design fits the base.



FEMP Designated Product: Compact Fluorescent Lamps



Buyer Tips

Some screw-based CFLs are difficult to fit into existing fixtures designed for incandescent bulbs; however, many CFLs now on the market are only slightly larger than standard incandescent bulbs. A few CFL models can be used with conventional dimming switches.

CFLs installed in enclosed fixtures designed for incandescent bulbs may overheat. This can significantly reduce both light output and lifetime. Even under optimum conditions, light output from a CFL will decrease over its lifetime. To maintain existing light levels, select CFLs with rated lumen output (of bulb and ballast together) at least as high as the bulbs they replace.

CFLs should have a power factor (PF) above 50% and a Color Rendering Index (CRI) above 80%. ENERGY STAR-qualified integral CFLs and most available modular CFLs meet these criteria.

Particularly for high-use fixtures, consider replacing an existing screw-based ("incandescent") fixture with one designed exclusively for CFL use—i.e., a fixture with a hard-wired ballast that accommodates pin-based CFLs. (Residential CFL fixtures are also covered by an ENERGY STAR labeling program; see *For More Information*.)

Cost-Effectiveness Example

Performance	Standard Life CFL (moderate use)		Extended Life CFL (high use)	
	Incandescent Bulb Replaced	Recommended CFL (6,000 hour life)	Incandescent Bulb Replaced	Recommended CFL (10,000 hour life)
Input watts (lumens per watt)	60 W (15 lpw)	17 W (60 lpw)	60 W (15 lpw)	17 W (60 lpw)
Annual Energy Use	72 kWh	20 kWh	120 kWh	34 kWh
Annual Energy Cost	\$4.30	\$1.20	\$7.20	\$2.04
Lifetime Energy Cost	\$18	\$5	\$30	\$9
Lifetime Energy Cost Savings	—	\$13	-	\$22

Cost-Effectiveness Assumptions

Energy use in the first example is based on a CFL life of 6,000 hours operating 1,200 hours per year. The second example uses a 10,000-hour CFL operating 2,000 hours per year. The assumed electricity price is 6¢ per kWh, the federal average electricity price in the U.S.

Lifetime Energy Cost is the sum of the discounted value of annual energy costs based on average usage and an assumed CFL life of 5 years. Future electricity price trends and a discount rate of 3.0% are based on federal guidelines effective from April 2006 to March 2007.

Using the Cost-Effectiveness Table

In the first example shown above, a standard-life 17-watt CFL is cost-effective (on energy savings alone) if its purchase price is no more than \$13 above the combined price of the 6-8 incandescent bulbs replaced. The second example, an extended-life CFL, is cost-effective if its price is no more than \$22 above the price of the 10-13 incandescent bulbs it replaces.

The calculations are for energy costs savings only and do not include lamp replacement or labor costs. If lamp replacement and labor cost are included, the savings will be significantly greater.

What If My Energy Prices Or Operating Hours Are Different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: (Your price in ¢/kWh) ÷ (6.0¢/kWh). Longer operating hours will make a CFL even more cost-effective.

For More Information:

EERE Information Center
1-877-EERE-INF or 1-877-337-3463
www.eere.energy.gov/femp/procurement/

The EPA/DOE ENERGY STAR® program provides product listings of complying CFLs and dedicated residential CFL fixtures.

Phone: (800) 372-7827
www.energystar.gov

The Lighting Research Center's Web site has valuable information covering CFLs and other lighting systems.

Phone: (518) 276-8716
www.lrc.rpi.edu

Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.

Phone: (202) 646-7954

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



U.S. Department of Energy

**Energy Efficiency
and Renewable Energy**

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable